

CLAIMS

1. A method of establishing a connection between two endpoints in a communications network, said communications network comprising a management layer and a physical layer; said physical layer comprising said endpoints and a plurality of nodes interconnected by links and said management layer comprising a plurality of management nodes each management node being connected to a physical node; and wherein said method comprises the steps of:
  - (i) establishing a first path over said management layer between two management nodes, one of said management nodes being connected to one of said endpoints and the other management node being connected to the other endpoint; and
  - (ii) establishing a second path between said endpoints over said physical layer wherein said first and second paths correspond;and wherein said step of establishing the second path is performed as an integral part of said step of establishing the first path.
2. A method as claimed in claim 1 wherein said connection provides a specified level of quality of service for a specified communication session using that connection.
3. A method as claimed in claim 1 wherein said connection is suitable for internet protocol traffic.
4. A method as claimed in claim 1 wherein a message protocol which involves the use of labels is used to establish said second path.
5. A method as claimed in claim 4 wherein labels are advertised by one or more of said physical nodes.
6. A method as claimed in claim 1 wherein said steps of establishing a first and a second path comprises establishing a connection between two adjacent management

- nodes and then establishing a connection between the corresponding two physical nodes.
7. A method as claimed in claim 1 wherein said step (i) of establishing a first path comprises the steps of:-
5. (i) determining a plurality of possible first paths between the endpoints;
- 10 (ii) determining a measure of preference for each of said possible first paths on the basis of information about the communications network and information about the specified communication session; and
- (iii) reserving bandwidth along the second path which corresponds to the most preferred first path according to said measures of preference.
8. A method as claimed in claim 1 wherein said physical layer of the communications network is configured such that a plurality of said links are of a specified capacity.
- 15 9. A method as claimed in claim 8 wherein nodes in said physical layer which are connected to a link of a specified capacity are arranged to advertise information about that link.
- 20 10. A method as claimed in claim 9 wherein said information comprises the source, destination and capacity of the link.
- 25 11. A method as claimed in claim 9 wherein said information comprises a label for use by a message protocol in order to traverse that link.
12. A method as claimed in claim 7 wherein said step of determining a plurality of possible paths comprises:-
- 30 (i) issuing one or more messages from a first one of the endpoints, said messages comprising information about the location of the second endpoint; and
- (ii) propagating each of said messages across the communications network to the second endpoint.

13. A method as claimed in claim 12 wherein said communications network comprises a plurality of nodes and wherein said method further comprises the step of:-  
5 (i) for each of said messages, recording information in that message about the location of each node traversed by that message.
14. A method as claimed in claim 13 wherein each of said messages contains information about the communication session and wherein said method further comprises the  
10 step of:  
(i) for each of said messages, when a message traverses a node, making a reservation of bandwidth on a link emanating from that node.
15. A method as claimed in claim 14 wherein said reservations  
15 are cancelled unless confirmed within a specified time period.
16. A communications network comprising at least two endpoints between which it is desired to establish a connection, said communications network comprising:-  
20 (i) a physical layer comprising said endpoints and a plurality of nodes interconnected by links; and  
(ii) a management layer comprising a plurality of management nodes, each management node being connected to a physical node, and a first one of said management nodes being connected to an endpoint and a second one of said management nodes being connected to the other endpoint; said management layer being arranged to establish a first path between said first and second management nodes; and said physical layer being arranged to establish a second path between said endpoints, over said physical layer, and corresponding to said first path; and wherein said communications network is arranged such that establishment of said second path is an integral part of establishment of said first path.

17. A communications network as claimed in claim 16 which is an internet protocol communications network.
18. A communications network as claimed in claim 16 which is an MPLS communications network.
- 5 19. A computer program stored on a computer readable medium said computer program being for controlling a communications network comprising at least two endpoints, a management layer and a physical layer, said physical layer comprising said endpoints and a plurality of nodes  
10 interconnected by links and said management layer comprising, a plurality of management nodes each management node being connected to a physical node; said computer program being arranged to control said communications network such that:
- 15 (i) a first path is established over said management layer between two management nodes, one of said management nodes being connected to one of said endpoints and the other management node being connected to the other endpoint;
- 20 (ii) a second path is established between said endpoints over said physical layer wherein said first and second paths correspond; and
- (iii) said establishment of the second path is performed as an integral part of said establishment of the first path.